RESULTS OF VIEWING SELECTED FILMS ON INCIDENTAL LEARNING

A Field Report

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by

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December 1982

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An abstract of a Field Report by
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The Problem. The problem of this study was to determine if incidental learning about the Bell System actually occurred as a result of students viewing selected films.

Procedure. Five films were selected as a representation of Bell System produced films. Pre- and post-tests were developed for each of the five films. Comparisons were made between grade levels, sex and schools. The Chi square test was applied to the data.

Findings. Significant differences were found between the male and female students. The females experienced a higher incidence of incidental learning. Differences between the grade levels were also found, with the fifth grade having a higher incidence of incidental learning. A difference between the schools was indicated, but no significant difference was found to exist. Incidental learning about the Bell System did occur.

Conclusions. The female students identified with the women as they were portrayed in the films. Male students may have had previous work experiences which affected their responses. The male students disregarded the non-essential material in the films. The younger the participant the higher the incidence of incidental learning.

Recommendations. Based on the findings of this study it is recommended that: (1) educators concerned about learning should effectively evaluate all films they intend to use, (2) industries evaluate the films ability to convey messages, (3) studies be performed to see how women are being portrayed in films, and (4) additional studies be done to survey educational associations to see how industrial films are being used.

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Chapter 1

INTRODUCTION

In the world of educational media today, there exists a rather large number of industrially produced films. These films have been distributed freely throughout various area educational offices and are available to the schools at no cost. The production and distribution of such films are often viewed as a public service by participating corporations. The Bell System has long been considered a leader in the area of film production. This corporation has designed quality films which have been readily accepted by the public. There are, of course, secondary reasons behind the expenditure of such dollars. In order to justify the cost of these films, they should present a favorable image of their company to the viewer. If this is true, the justification for the expense is accepted and the films become important tools for use in public relations.

Statement of the Problem

The purpose of this study was to determine if incidental learning about the Bell System actually occurred as a result of students viewing selected films.

Questions to be Answered

The problem raises the following questions:

1. Will there be a significant amount of incidental learning about the Bell System as a result of viewing selected films?
2. Will there be significant differences in the amount of incidental learning between males and females?
3. Will there be significant differences in incidental learning between grade levels?
4. Will there be a difference in incidental learning between schools?

Significance of the Study

Those persons responsible for training and evaluation within the Bell System have a need to know whether or not company produced films are effective in eliciting the intended behavioral outcomes. Also, there is a need for management personnel to develop a process whereby each film is evaluated on its merit.

While a limited study of this nature will not permit one to generalize the results, educators might be able to make use of some of the data.

Definition of Terms

The following terms used in this paper are defined. In this study, the term incidental learning refers to learning which occurs in conjunction with or in addition to the intended content material.[1]

The term distractor refers to a specific procedure which will attempt to lead students' attention away from the material being presented in a film.

Limitations of the Study

The results and conclusions of this research study were limited in their application to the fifth and sixth grade classes of Parkview and Southeast elementary schools in Ankeny, Iowa. It was not the intent of this research to infer that any conclusions or implications would relate to any other school district or school setting.

This study concerned itself with incidental learning from films about the Bell System. It was not concerned with the amount of content material learned or any possible attitude change that occurred as a result of viewing selected Bell System films.

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[1]Charles L. Barnes, The American College Dictionary (New York: Random House, Inc., 1959), p. 612.

Summary

In this chapter, the problem and purpose of this study were stated, questions were asked, significance and definition of terms were given. This chapter also included the limitations of this study. The following chapter will present a review of related literature. The remaining chapters will consider the methodology, presentation of data and the final chapter will report the findings, conclusions, and recommendations for this study.

Chapter 2

REVIEW OF RELATED LITERATURE

There has been extensive research developed in the area of how people learn. Studies performed by such authors as Bloom,[1] and Guilford[2] have shown that the learning process is very complex. It has become apparent that each individual has his own learning style and speed which is unique to that person. Learning is a relatively permanent process resulting from practice which is reflected in a change in performance and perhaps attitude. Some researchers have found that learning can also refer to an association between events which can cause or trigger a certain stimulus which then results in a response.[3]

Since various studies have shown that learning is a multifarious process, this study will focus on only one aspect of that process; that being incidental learning

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[1]B. S. Bloom, Taxonomy of Educational Objectives, the Classification of Educational Goals (New York: David McKay Co., Inc., 1964).

[2]J. P. Guilford, Intelligence, Creativity and their Educational Implications (San Diego: R. R. Knapp, 1968).

[3]Frank A. Logan, Learning and Motivation (Dubuque: William C. Brown Co., 1970), p. 2.

during films viewing.

Relating the various theories of learning to films and the educational setting is not a new concept. In fact, since the dawn of the motion picture educators and the like have used films as a means of teaching. This particular form of media, as a teaching tool, has unique characteristics that more traditional methods lack. Andrew Buchanan points to this in his statement:

> The mind soaks up subject-matter on the screen as effortlessly as a sponge soaks up water.... film in the classroom can illustrate and inform upon matters difficult to describe verbally, and bring the first-hand knowledge and, indeed, the personalities of specialists to schools however remote.[1]

The fact that films can and have been used effectively with excellent results in educational settings is of little dispute. Since the eye and the mind have the ability to absorb information which is presented in film, it has become necessary to see what learning actually takes place while students are viewing films.

Some research studies, such as those performed by Stevenson, have pointed out that there may be various age levels where the rate of incidental learning is higher than at other age levels.[2] Stevenson also found that even

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[1]Andrew Buchanan, The Film in Education (London: Latimer, Trend and Co., Ltd., 1951), p. 17.

[2]Harold W. Stevenson, "Latent Learning in Children," Journal of Experimental Psychology, XLVII (January, 1954), 17.

though incidental learning may not appear with students at a lower level of maturity it may be found in students at a higher level. This might indicate that subtle differences within experiences which students have with irrelevant items will influence the degree to which they will acquire information.[1] In essence, Stevenson and Siegel have found that incidental learning increases with age.[2]

The notion that as one gets older one is able to learn more and more quickly is somewhat of a straight forward statement. There are authors who not only tend to disagree with this statement, but also disagree with what Siegel and Stevenson have reported. Research performed by Collins indicated that children develop in the ability to attend selectively to information inputs.[3] The results of his study suggest that there may be a relationship between one's age and the ability to focus on essential information. It would appear that age may or may not be a major factor in incidental learning.[4]

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[1]Stevenson, p. 20.

[2]Alexander Siegel and Harold Stevenson, "Incidental Learning: A Developmental Study," Child Development, XXXVII (December, 1966), 811.

[3]W. A. Collins, "Learning of Media Content: A Developmental Study," Child Development, XLI (December, 1970), 1140.

[4]Collins, p. 1140.

Hawkins, when doing a replicative study of Collins, found that interest in a topic will increase the amount of incidental material learned.[1] His study indicated that while incidental learning decreased with age, junior high level and above, when viewing adult level films, learning increased when viewing children's level films.[2]

Some reports have considered other factors when measuring the level of incidental learning. Maccoby and Hagen tested two groups of students using various distractors. They found that central recall, content memory, and not incidental recall increases with age.[3] Maccoby and Hagen concluded:

> Children are resumably handicapped in focusing attention selectively, part of this is due to the lack of previously established discriminations between task-relevant and task-irrelevant material.[4]

In further studies which Hagen performed, independent of Maccoby, he found that when distractors were used

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[1]Robert P. Hawkins, "Learning of Peripheral Content in Films: A Developmental Study," Child Development, XXXIV (March, 1973), 214.

[2]Hawkins, p. 216.

[3]E. E. Maccoby and John Hagen, "Effects of Distraction upon Central Versus Incidental Recall: Developmental Trends," Journal of Experimental Child Psychology, II, No. 3 (September, 1965), 288.

[4]Maccoby and Hagen, p. 281.

the recall of task-relevant material increases with age.[1] These studies indicated that the younger children, grades one through six, will have higher levels of incidental learning than do older ones, grades seven through nine, because of the age difference.[2]

There have been other research reports conducted to determine what effect special incentives would have on the amount of incidental material learned. The results of these studies, such as those by Kausler, Laughlin and Trapp, revealed that there is a possible superiority in incidental learning for those groups which were given incentives compared to the non-incentive groups.[3]

As indicated by this review of literature, the amount of incidental learning that takes place may often be determined or controlled by programmed or non-programmed variables. Most researchers who have studied incidental learning have found that, over-all, incidental learning increases between grades three through six. Signs of a

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[1]John W. Hagen, "The Effects of Distraction on Selective Attention," Child Development, XXXVIII (September, 1967), 694.

[2]Hagen, p. 694.

[3]D. H. Kausler, P. R. Laughlin and E. P. Trapp, "Effects of Incentive-set on Relevant and Irrelevant (Incidental) Learning in Children," Child Development, XXXIV (March, 1963), 196.

decline may be seen beginning at the seventh grade level.[1]

The causes for this phenomenon may be attributable either to an increasing ability to learn and retain or to an increasing tendency to attend to the incidental stimuli, non-content information, in films.[2] Research by Hale, Miller and Stevenson indicated that the increase in incidental learning was a consequence of the tendency for older students to disregard non-essential material.[3] Vurpillet, in her research, discovered that students' abilities to attend perceptually, as it relates to incidental learning, does in fact increase during the elementary years.[4]

The aforementioned research supports the fact that incidental learning does occur while students are viewing films. This review might also suggest that carefully designed films may be a means by which opinions and ideas can be developed in the viewer.[5]

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[1]G. A. Hale, L. K. Miller and H. W. Stevenson, "Incidental Learning of Film Content: A Developmental Study," Child Development, XXXIX (March, 1968), 69.

[2]Siegel and Stevenson, p. 816.

[3]Hale, Miller and Stevenson, p. 69.

[4]Elaine Vurpillot, "The Development of Scanning Strategies and Their Relation to Visual Differentiation," Journal of Experimental Child Psychology, VI (December, 1968), 649.

[5]William C. Miller, "An Experimental Study of the Relationship of Film Movement and Emotional Involvement Response and Its Effect on Learning and Attitude Formation" (Doctoral dissertation, University of Southern California, 1967), p. 28.

Regardless of the motives behind the production of the various films, educators must always be aware of what their students are learning and the means by which they learn. Films, when used intelligently and carefully, could be an effective teaching tool for educators.[1]

Summary

The research studies reviewed in this report have indicated that incidental learning occurs more frequently between grades three through six. At the seventh grade level, this phenomenon begins to decline and does so with age. The following chapter will address the methodology of this study.

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[1]Mark A. May and A. A. Humsdain, Learning from Films (New Haven: Yale University Press, 1958), p. 3.

Chapter 3

METHODOLOGY OF THE STUDY

The purpose of this study was to determine if incidental learning occurred as a result of students viewing Bell System films. In this chapter, the assumptions, method, and procedures for treating the data will be presented.

Assumptions

For this study and in attempting to collect effective data the following assumptions were made:

1. All students will respond equally and as honestly as possible to all questions asked.
2. All teachers involved in this study will follow the instructions and established guidelines.
3. The five films, selected from among sixty, were assumed to be representative of the films produced by the Bell System.

Method

The subjects in this research report were selected because of their geographic proximity, accessibility, and availability to the researcher. Permission was granted by

the director of the elementary section to conduct this research in the Ankeny school district. This study involved one fifth grade and one sixth grade class at both Parkview and Southeast elementary schools. There were a total of ninety-seven students participating in this study.

The data collecting device, designed specifically for this study, consisted of pre-tests and post-tests for each of the five films. Different questions were asked for each film. (See Appendix A.)

The students were required to take a pre-test prior to viewing each film. Immediately following the post-test was given. The teachers were instructed not to allow any discussion until each post-test had been returned. This was done to insure reliability in the answering.

The validation for this data collecting device was performed in Ankeny by using a representative group of students not involved in the actual project. The students were selected for their proximity, accessibility, and availability to the researcher. The reactions to the device were collected and analyzed. No corrections were required and the research proceeded.

Procedures for Treating Data

The amount of incidental learning was readily observable by computing the results of the pre- and post-tests. The results indicated whether or not incidental learning had

taken place. In order to answer the questions of this study, it was necessary to look closer at the data. (See Appendix B.)

The raw data collected by this device were discrete in nature. Since this condition existed, the Chi square test was applied for the analysis. The level of significance was determined to be .05.

Summary

In this chapter the assumptions, method, and procedure for treating the data in this research study were presented. The following chapter will present the data derived from this research. The last chapter will give the conclusions, discussion, and recommendations.

Chapter 4

PRESENTATION OF DATA

The purpose of this study was to determine if incidental learning about the Bell System occurred as a result of students viewing Bell System films. This chapter will present the data derived from the pre- and post-tests and the analysis of these data.

Findings and Analysis

The data collecting device used in this study generated a total of 970 individual test sheets which were collected from the ninety-seven participants.

Table 1 describes an overall summary of the findings. This table presents the scores for both the pre-test and post-test and the computed difference between them. The total of the computed difference column indicates that there was a difference between the pre- and post-tests of 441.

Table 2 describes the differences between the pre- and post-test scores for the participating fifth graders at Parkview. The results of these scores had a Chi square of 13.67 which is significant at the .05 level with one degree of freedom. This table also shows that the females had a

Table 1

Totals by Grade, Gender, Film and School for the Pre- and Post-tests Including the Computed Difference

School	Grade	Gender	Film #[a]	Pre-Test	Post-Test	Computed Difference
	5	M	1	15	24	9
	5	F	1	37	38	1
S.E.	5	M	2	17	24	7
	5	F	2	41	46	5
	5	M	3	9	16	7
	5	F	3	23	40	17
	5	M	4	12	20	8
	5	F	4	13	45	32
	5	M	5	21	24	3
	5	F	5	30	44	14
	5	M	1	26	40	14
	5	F	1	28	49	21
P.V.	5	M	2	31	45	14
	5	F	2	28	39	11
	5	M	3	23	31	8
	5	F	3	11	31	20
	5	M	4	24	29	5
	5	F	4	16	44	28
	5	M	5	36	45	9
	5	F	5	25	40	15
	6	M	1	34	62	28
	6	F	1	28	31	3
S.E.	6	M	2	47	55	8
	6	F	2	28	29	1
	6	M	3	31	31	0
	6	F	3	9	25	16
	6	M	4	47	49	2
	6	F	4	20	25	5
	6	M	5	43	40	-3
	6	F	5	16	34	18

Table 1 (continued)

School	Grade	Gender	Film #[a]	Pre-Test	Post-Test	Computed Difference
	6	M	1	41	50	9
	6	F	1	31	47	16
P.V.	6	M	2	29	46	17
	6	F	2	28	49	21
	6	M	3	29	33	4
	6	F	3	24	35	11
	6	M	4	45	57	12
	6	F	4	31	45	14
	6	M	5	50	52	2
	6	F	5	34	43	9
					Total =	441

[a] Key to Films
1 = International Cooperation
2 = To Alter Time
3 = Laser
4 = Microworld
5 = Global Arena

higher score than did the males. Therefore, the females had a higher incidence of incidental learning.

Table 2

Computed Differences Between Males and Females in the Fifth Grade at Parkview

Gender	No. of Students	Computed Difference
Males	13	50
Females	13	95

Table 3 describes the differences between the males and females participating from the sixth grade class. The data displayed in this table results in a Chi square of 8.64 which is significant at the .05 level with one degree of freedom. This table does show that the females had a higher score, and therefore a higher incidence of incidental learning.

Table 3

Computed Differences Between Males and Females in the Sixth Grade at Parkview

Gender	No. of Students	Computed Difference
Males	14	44
Females	13	71

Table 4 describes the differences between the male and female fifth grade students at Southeast. This table does show that there were more females than males in this situation and that the computed differences were higher. The data presented in Table 4, when computed, results in a Chi square of .99 which is not significant at the .05 level with one degree of freedom.

Table 4

Computed Differences Between Males and Females in the Fifth Grade at Southeast

Gender	No. of Students	Computed Difference
Males	6	43
Females	15	69

Table 5 describes the differences between the sixth grade male and female students at Southeast. The scores, as presented in this table, result in a Chi square of 4.30 which is significant at the .05 level with one degree of freedom. The female students had a higher score than did the males. This indicates a higher incidence of incidental learning for the female students.

Table 5

Computed Differences Between Males and Females in the Sixth Grade at Southeast

Gender	No. of Students	Computed Difference
Males	13	35
Females	10	43

Table 6 describes the difference between the test results for the male and female students in both schools. As the table indicates, the females had scores almost twice as high when compared to the males. The data in this table results in a Chi square of 19.6 which is significant at the .05 level with one degree of freedom.

Table 6

Total Number of Males and Females with the Number of Observed Differences

Gender	No. per School S.E.	P.V.	Computed Difference
Males	19	27	163
Females	25	26	278

Table 7 describes the differences between the grade levels in both schools. This table does show that the fifth grade scored about 25 percent better than did the sixth grade. This data results in a Chi square of 10.84, and

is significant at the .05 level.

Table 7

Total Number of Students by Grade Level with the Observed Differences

Grade Level	No. of Students S.E.	P.V.	Computed Difference
5	21	26	248
6	23	27	193

Table 8 presents the differences between the total number of participating students in each school. This data does indicate a difference between the schools in terms of total scores. As it shows, Parkview has nearly twice the score than Southeast. When this data was computed, however, it resulted in a Chi square of 3.38 which was not significant at the .05 level with one degree of freedom.

Table 8

Total Number of Students in Each School and the Observed Differences

School	Total No. of Students	Computed Difference
Parkview	53	260
Southeast	44	181

Summary

This chapter presented the data for this research project. The data showed several differences in the scores for the male and female students. It also showed differences in the scores for the grade levels and for the schools. The final chapter in this study will present the summary of the investigation, conclusions, discussion, and recommendations derived from this research.

Chapter 5

SUMMARY, CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

Summary of the Investigation

The purpose of this study was to determine if incidental learning about the Bell System occurred as a result of students viewing films that were produced by the Bell System. Four questions were asked as a result of this research:

1. Will there be a significant amount of incidental learning about the Bell System as a result of viewing selected films?
2. Will there be significant differences in the amount of incidental learning between males and females?
3. Will there be a significant difference in incidental learning between grade levels?
4. Will there be a difference in incidental learning between schools?

Data for this research study were collected by means of pre- and post-tests. The participating students viewed a series of five films produced by the Bell System. Immediately preceding each film, a pre-test was given. Following each film, the post-test was administered. The

difference between the pre- and post-test scores indicated whether or not incidental learning had occurred.

Summary of the Findings

In response to question number one, as it relates to the entire population, the findings indicated that incidental learning about the Bell System did occur. The scoring showed the incidence of incidental learning occurred twice as much as was expected.

Concerning question two, the research found that a significant relationship did exist. The data indicated a tendency for the female students to experience higher computed differences than the males, and therefore a higher incidence of incidental learning.

In response to question three, a significant difference was found to exist. The results of the data indicated that the fifth grade classes scored higher on the computed differences. This indicated that the fifth grade had a higher incidence of incidental learning.

In answer to question four, the data indicated that no significant difference existed between the schools. This condition occurred even though there were differences in the number of students at each school.

Conclusions and Discussion of the Findings

The questions posed in this study centered on incidental learning about the Bell System and the data accumulated by this study prompted the following conclusions and discussion.

First, female participants obtained a higher rate of incidental learning than did the males. The causes for this phenomenon could be multifarious in nature. It may be that a new awareness on the part of the female students about non-traditional work environments had emerged. The review of literature indicated that the female students would identify with the female roles as they are depicted in the film. These studies have shown that the female seldom experienced a higher incidence of incidental learning over the male students. This may suggest that females are now being portrayed in the non-traditional working role.

Another possible cause may be that the male students have had previous work experience that could have affected the responses. In relation to this, the review of literature indicated that incidental learning can be in direct relationship with previous learning experiences.

Other possible causes and factors may play a role in this situation. One such cause could be that the male students were able to disregard non-essential material, and in doing so were able to concentrate solely on the content of the film. If this condition did exist, it would have had

a direct effect on how they would respond. One fact does stand out in this situation and that is there were five more females than males involved in this study. This difference may have accounted for a very minute percentage of the computed differences, but in no way should it be considered a prime cause.

Second, this study indicates a difference between the grade levels. This condition relates directly to previous research, as indicated by the review of literature, which revealed that the younger the participants the higher the incidence of incidental learning. This study then supports this theory since the fifth grade classes experienced a greater incidence of incidental learning than did the sixth grade classes.

Third, the findings indicated that even though the total computed differences described by the data would normally indicate that a difference between schools was expected, a significant difference did not exist. This condition may be somewhat misleading considering there were more students at Parkview than at Southeast. Regardless of this situation, the data derived from this study supported, as depicted in the review of literature, observations that incidental learning from films did occur. The data also indicated that incidental learning about the Bell System occurred as a result of students viewing these selected films.

Recommendations

On the basis of the findings of this study, it is recommended that:

1. Educators and instructors concerned about the learning process should address themselves to the task of effectively evaluating each film they intend to use.

2. The industries, local or national, that produce and distribute films for educational use need to assess the effectiveness of each film in its ability to convey subtle messages about their company.

3. Studies should be conducted to determine how women are being portrayed in various work environments in educational films, and to determine the effect that these films have on the populace.

4. Other studies could focus on statistical surveys of Area Educational Associations and local school districts to see how industrial films are being used.

Today, with the financial uncertainties, producers of films and those educational institutions that use them need to, and indeed, must determine the value that films hold for them, and then communicate these needs and concerns among one another. If this communication does not develop in the future, excellent films may not be produced, and if produced needlessly they will not be purchased or used.

BIBLIOGRAPHY

BIBLIOGRAPHY

Books

Barnes, C. L. The American College Dictionary. New York: Random House, Inc., 1959.

Bloom, B. S. Taxonomy of Educational Objectives, The Classification of Educational Goals. New York: David McKay Co., Inc., 1964.

Buchanan, Andrew. The Film in Education. London: Latimer, Trend and Co., Ltd., 1951.

Guilford, J. P. Intelligence, Creativity and their Educational Implications. San Diego: R. R. Knapp, 1968.

Logan, Frank A. Learning and Motivation. Dubuque: William C. Brown Co., 1970.

May, Mark A., and A. A. Humsdain. Learning from Films. New Haven: Yale University Press, 1958.

Periodicals

Collins, W. A. "Learning of Media Content: A Developmental Study." Child Development, XLI (December, 1970), 1133-1142.

Hagen, John W. "The Effects of Distraction on Selective Attention." Child Development, XXXVIII (September, 1967), 685-694.

Hale, G. A., L. K. Miller and H. W. Stevenson. "Incidental Learning of Film Content: A Developmental Study." Child Development, XXXIX (March, 1968), 69-78.

Hawkins, Robert P. "Learning of Peripheral Content in Films: A Developmental Study." Child Development, XXXIV (March, 1973), 214-217.

Kausler, D. H., P. R. Laughlin and E. P. Trapp. "Effects of Incentive-set on Relevant and Irrelevant (Incidental) Learning in Children." Child Development, XXXIV (March, 1963), 195-199.

Maccoby, E. E., and J. W. Hagen. "Effects of Distraction upon Central Versus Incidental Recall: Developmental Trends." Journal of Experimental Child Psychology, II, No. 3 (September, 1965), 280-288.

Siegel, Alexander W., and H. W. Stevenson. "Incidental Learning: A Developmental Study." Child Development, XXXVII (December, 1966), 811-817.

Stevenson, Harold W. "Latent Learning in Children." Journal of Experimental Psychology, XLVII (January, 1954), 17-21.

Vurpillot, Elaine. "The Development of Scanning Strategies and Their Relation to Visual Differentiation." Journal of Experimental Child Psychology, VI (December, 1968), 632-650.

Other Sources

Miller, William C. "An Experimental Study of the Relationship of Film Movement and Emotional Involvement Response and Its Effect on Learning and Attitude Formation" (Doctoral dissertation, University of Southern California, 1967).

APPENDIX A

SAMPLE PRE- AND POST-TESTS

To Alter Time

Please check: Pre or Post

Male _____ Female _____

Grade Level: 5th _____ 6th _____

Directions: Please respond to the following statements in light of what you presently know about them. To answer just select YES, if you do agree with the statement, NO, if you do not agree with the statement or NOT SURE, if you really do not know for sure. Please circle your choices.

1. The Bell System "Long Lines" is a complex telephone network used when making long distance calls.

   YES NO NOT SURE

2. It is now possible to send letters over the telephone lines as well as by mailing them.

   YES NO NOT SURE

3. The Bell System can use many different types of telephone equipment when helping customers complete a call.

   YES NO NOT SURE

4. The Bell System has helped to change the world in which we live.

   YES NO NOT SURE

Laser

Please check: Pre or Post

Male _____ Female _____

Grade Level: 5th _____ 6th _____

Directions: Please respond to the following statements in light of what you presently know about them. To answer just select YES, if you do agree with the statement, NO, if you do not agree with the statement or NOT SURE, if you really do not know for sure. Please circle your choices.

1. The discovery of the laser beam was due to the research done by the Bell System laboratories.

   YES NO NOT SURE

2. The laser beam may become a very useful tool for the communications industry in the very near future.

   YES NO NOT SURE

3. Due to the past research efforts of the Bell System, lasers are being used with great success in such areas as medicine and science today.

   YES NO NOT SURE

Microworld

Please check: Pre or Post

Male _____ Female _____

Grade Level: 5th _____ 6th _____

Directions: Please respond to the following statements in light of what you presently know about them. To answer just select YES, if you do agree with the statement, NO, if you do not agree with the statement or NOT SURE, if you really do not know for sure. Please circle your choices.

1. The present day electronic revolution is directly related to the invention of the transistor, which was invented by the Bell System laboratories.

   YES NO NOT SURE

2. Bell telephone companies are involved in designing and manufacturing computer parts and equipment.

   YES NO NOT SURE

3. The telephones that we use today are made up of microelectronic parts created by the Bell System.

   YES NO NOT SURE

4. Many of the solid-state electronic parts in your televisions and radios were invented and designed by the Bell System.

   YES NO NOT SURE

International Cooperation

Please check: Pre or Post

Male _____ Female _____

Grade Level: 5th _____ 6th _____

Directions: Please respond to the following statements in light of what you presently know about them. To answer just select YES, if you do agree with the statement, NO, if you do not agree with the statement or NOT SURE, if you really do not know for sure. Please circle your choices.

1. The Bell System has been a leader in the area of international telephone communications.

   YES NO NOT SURE

2. It has taken a lot of cooperation between various nations along with the Bell System when attempting to create telephone systems between these nations.

   YES NO NOT SURE

3. When laying deep sea cable the Bell System has had the help of various navies and coast guards from foreign countries.

   YES NO NOT SURE

4. The Bell System has developed a complex communications system which will insure that the nations of the world will be able to talk to one another.

   YES NO NOT SURE

Global Arena

Please check: Pre or Post

Male _____ Female _____

Grade Level: 5th _____ 6th _____

Directions: Please respond to the following statements in light of what you presently know about them. To answer just select YES, if you do agree with the statement, NO, if you do not agree with the statement or NOT SURE, if you really do not know for sure. Please circle your choices.

1. Through the use of special telephone equipment it is possible to send photographs over telephone lines.

   YES NO NOT SURE

2. The Bell System and many of its companies have worked with the television industry in broadcasting major sporting events around the world.

   YES NO NOT SURE

3. The Bell System has invented several new communications systems, such as the "light wave" and "laser TV pictures." These systems were in use at the 1980 Winter Olympics.

   YES NO NOT SURE

4. Through the use of special microwave towers and satellites the Bell System was able to send the Olympics to every corner of the world in seconds.

   YES NO NOT SURE

APPENDIX B

ORIGINAL TALLY SHEETS

International Cooperation

Parkview 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |	|||	𝍸 𝍸 𝍸 ||||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 |||		𝍸 𝍸 𝍸 𝍸 |||
Totals	54	3	42

Parkview 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	|||	𝍸
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	||	𝍸 |
Totals	89	5	11

To Alter Time

Parkview 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸

Laser

Parkview 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 III	III	𝍸 𝍸
Female	𝍸 𝍸 I		𝍸 𝍸 𝍸 𝍸 𝍸
Totals	34	3	35

Parkview 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 I	I	IIII
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 I		𝍸
Totals	62	1	9

Microworld

Parkview 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸

Global Arena

Parkview 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸

International Cooperation

Parkview 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 | 𝍸 𝍸 𝍸 𝍸	||	𝍸 ||||
Female	𝍸 𝍸 𝍸 | 𝍸 𝍸 𝍸	||||	𝍸 𝍸 |||
Totals	72	6	22

Parkview 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸		||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||		|
Totals	87	0	3

To Alter Time

Parkview 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	𝍸	𝍸 𝍸 𝍸 𝍸 ||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||	𝍸 ||||	𝍸 𝍸 𝍸
Totals	57	14	37

Parkview 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |		||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	|	||
Totals	95	1	4

Laser

Parkview 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 IIII		𝍸 II
Female	𝍸 𝍸 𝍸 𝍸 𝍸 IIII	II	𝍸 𝍸 III
Totals	53	2	20

Parkview 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 III 𝍸 𝍸 𝍸		III
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 IIII	III	I
Totals	68	3	4

Microworld

Parkview 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	II	𝍸 IIII
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 I	III	𝍸 𝍸 𝍸 III
Totals	76	5	27

Parkview 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 II	II	I
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	II	I
Totals	102	4	2

Global Arena

Parkview 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸 ||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	||	𝍸 𝍸 ||
Totals	84	5	19

Parkview 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	|	𝍸 |
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||	|||	|||
Totals	95	4	9

International Cooperation

Southeast 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸	𝍸	
Female	𝍸 𝍸 𝍸 ‖ 𝍸 𝍸 𝍸 𝍸		𝍸 𝍸 𝍸
Totals	52	5	15

Southeast 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 ||||	|	|||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |||		𝍸 |
Totals	62	1	9

To Alter Time

Southeast 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 ||	𝍸	||
Female	𝍸 𝍸 𝍸 𝍸 | 𝍸 𝍸 𝍸 𝍸	|	𝍸 𝍸
Totals	58	6	12

Southeast 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 ||||		
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |		𝍸 |
Totals	70	0	6

Laser

Southeast 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	9	4	2
Female	18	5	13
Totals	32	9	19

Southeast 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	16	2	
Female	40	1	1
Totals	56	3	1

Microworld

Southeast 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	12	6	6
Female	13	7	20
Totals	25	13	46

Southeast 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	20	1	3
Female	24	6	9
Totals	65	7	12

Global Arena

Southeast 5th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 |	|	||
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	|	𝍸 𝍸 𝍸 𝍸 |
Totals	51	2	23

Southeast 5th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 ||||		
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	|	𝍸 ||
Totals	68	1	7

International Cooperation

Southeast 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸
Totals	62	9	9

Southeast 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸
Female	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸	𝍸
Totals	93	11	6

To Alter Time

Southeast 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	III	II
Female	𝍸 𝍸 𝍸 𝍸 𝍸 III	𝍸	III
Totals	75	8	5

Southeast 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	I	
Female	𝍸 𝍸 𝍸 𝍸 𝍸 III	II	I
Totals	83	3	1

Laser

Southeast 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |	𝍸 |	𝍸
Female	𝍸 ||||	||||	𝍸
Totals	40	10	10

Southeast 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 |	|	|
Female	𝍸 𝍸 𝍸 𝍸 𝍸	|	|
Totals	56	2	2

Microworld

Southeast 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||	𝍸 |||	||||
Female	𝍸 𝍸 𝍸 𝍸	𝍸	𝍸 ||
Totals	67	13	11

Southeast 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 ||||	𝍸 ||	||||
Female	𝍸 𝍸 𝍸 𝍸 𝍸	||||	|||
Totals	74	11	7

Global Arena

Southeast 6th Grade (Pre-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸 |	𝍸
Female	𝍸 𝍸 𝍸 |	||	𝍸 |
Totals	59	8	11

Southeast 6th Grade (Post-test)

	YES	NO	NOT SURE
Male	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	𝍸 |	|
Female	𝍸 𝍸 𝍸 |||| 𝍸 𝍸 𝍸	|||	|||
Totals	74	9	4